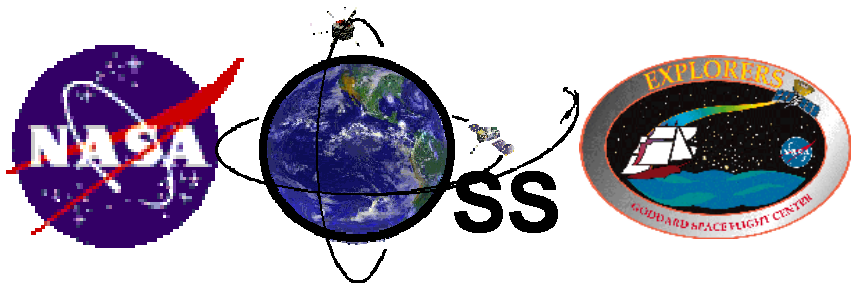


SMEX 2003 PrePropConf Evaluation and Selection Process

Evaluation and Selection Process

Paul Hertz, Explorer Program Scientist

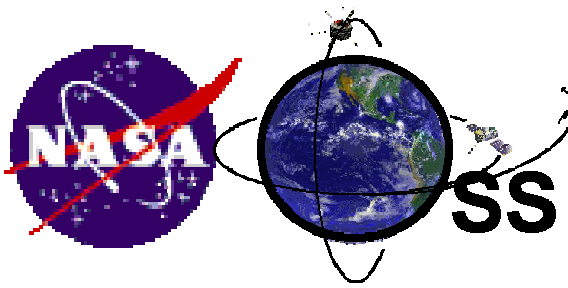
- Amendment to AO
- AO Highlights
- Evaluation, Categorization, Selection Process
- Evaluation Criteria
- Guidelines for Proposals



SMEX 2003 PrePropConf Evaluation and Selection Process

Amendment to SMEX AO

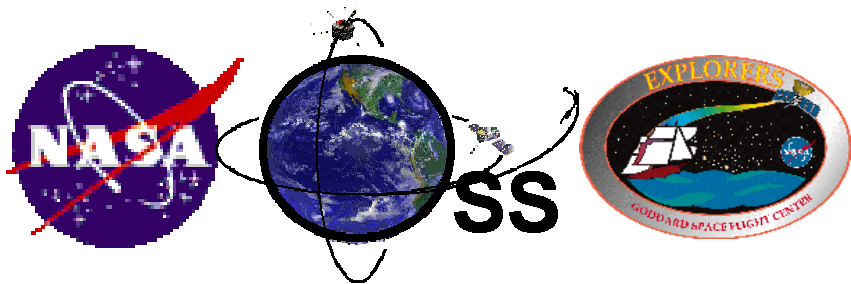
- ISS attached payloads, launched on the Space Shuttle, are still solicited in the SMEX AO.
- Space Shuttle launch costs for ISS-attached payloads are not guaranteed during Stage 1.
 - Shuttle launched ISS-attached payloads are being solicited
 - Final costing will be based on an agency-wide Shuttle-costing policy. This policy will be available during Phase A
 - For Stage 1 proposals, consult with the ISS opportunities POC and use the rule-of-thumb for estimating Shuttle launch costs that is in the Explorer Program Library



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights

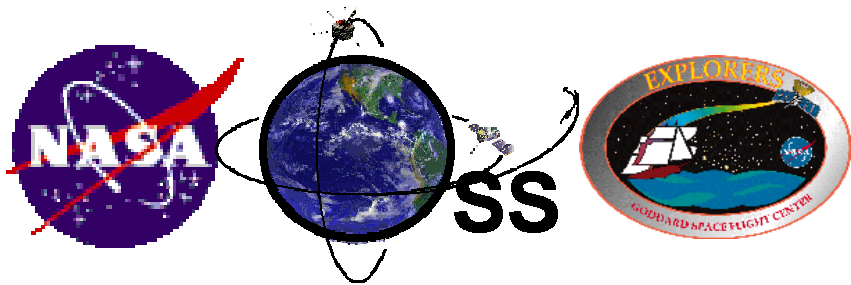
- Science Investigations must support scientific objectives of
 - Astronomical Search for Origins (includes astrobiology and planet finding)
 - Structure and Evolution of the Universe (includes tests of fundamental laws of physics as relevant to astrophysics and cosmology)
 - Sun-Earth Connection
- This AO solicits
 - Small Explorer (SMEX) investigations
 - expect to select and launch 2
 - Missions of Opportunity (MO) investigations
 - may or may not select one (or more)
 - MO is an opportunity to propose



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights

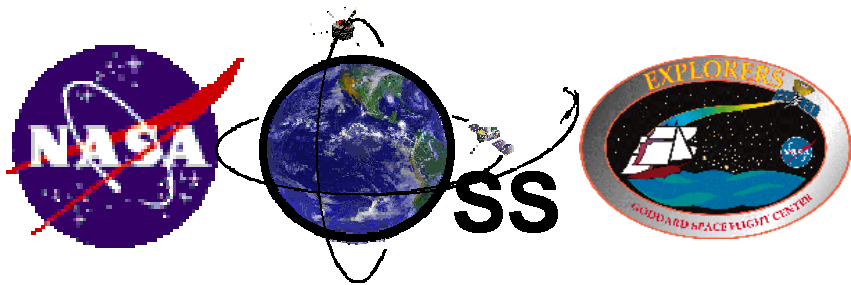
- SMEX Investigation may be
 - Free flyer launched by ELV
 - ISS attached payload
 - No Shuttle launched free flyer
- MO Investigation may be
 - Partner MO: OSS participation in non-OSS mission
 - Long duration balloon (LDB) investigation
 - Small ISS attached payload investigation
 - New Science Mission Extension investigation
 - Data buys



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights

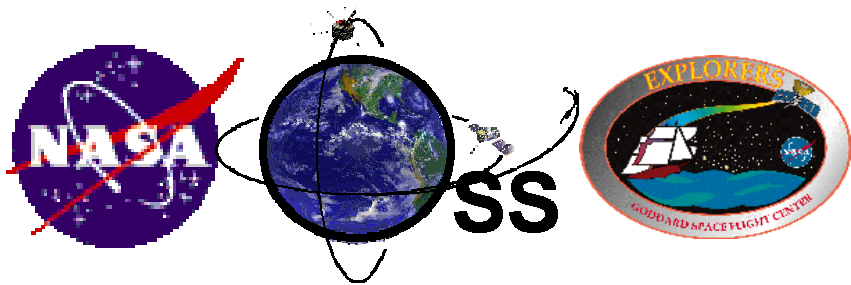
- Two-Phase, One-Step Procurement
 - Phase I:
 - Solicit science proposals with sufficient implementation information to evaluate risk.
 - Select ~4 proposals for 5-month Concept Studies
 - MO could be selected for implementation
 - Phase A Funding: \$500K for MIDEX, \$250K for MO
 - Phase II:
 - Evaluate Concept Study Reports
 - Technical risk, management risk, cost risk
 - E/PO plan, SDB and new technology plans
 - Downselect to ~2 investigations for implementation
 - MO gets decision to continue or not



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights : Launch

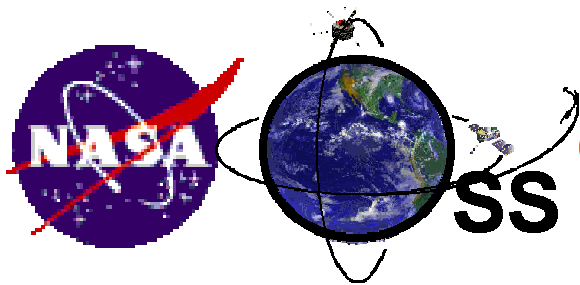
- Launch must be no later than 31 August 2008
 - Includes ELV SMEX, LDB MO
 - ISS attached payloads must proposed to an identified opportunity (all no later than 2008)
 - Partner MO and extension MO requires NASA commitment no later than 31 December 2005
- ISS attached payloads
 - Must propose to a specific opportunity identified in the AO and the Explorer Program Library.
 - Must include placeholder costs for launch and standard services in budget (refine in Phase A)
 - Must include mission unique/special services costs in budget
 - Must mitigate risk of launch delay [VERY IMPORTANT]



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights : Science Requirements

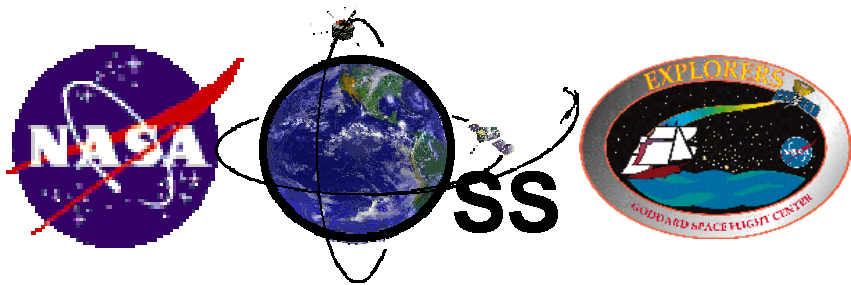
- Scientific requirements for the investigation must be explicitly described and linked to the scientific objectives
- Relationship between the objectives, the data, and the instrument payload must be unambiguous and clearly stated in the proposal
- Requirements that these objectives and observations impose on the mission design elements must be explicitly described
- Required “science objectives-to-measurements-to-mission traceability” may be provided either in narrative or tabular form



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights : Data

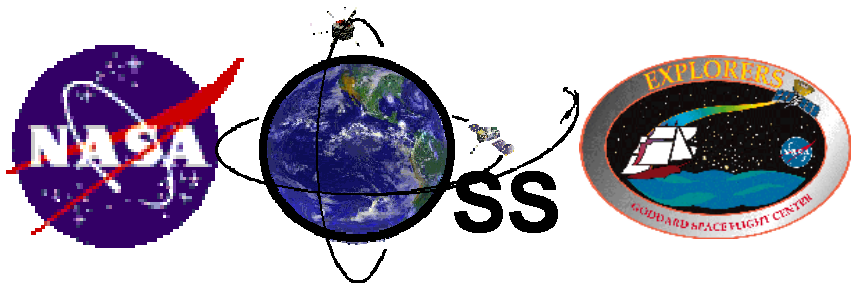
- Data must be made fully public, in a useable form, in a reasonable time
 - Data should be released as soon as possible
 - Short proprietary period may be proposed with justification
- Options for Enlarging Science Impact (Phase F)
 - E.g. extended missions, guest investigators, archival data analysis programs, etc.
 - Baseline mission must accomplish proposed science goals
 - Options beyond baseline may be included
- Guidelines for data archiving



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights : Cost

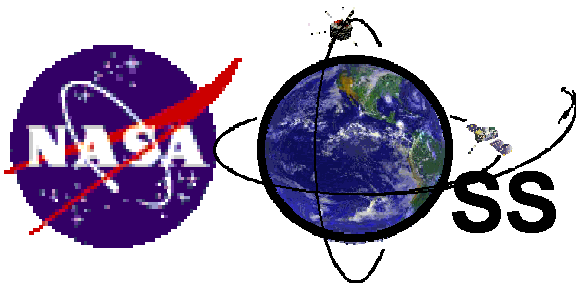
- SMEX hard cost cap is \$120M FY03
 - MO soft cost cap is \$35M FY03
 - 20% minimum cost reserve at Confirmation commensurate with mission complexity and risk
- Contributions for SMEX remain at 1/3 of OSS cost
- Government Furnished Equipment (GFE)
 - Expendable launch vehicle services
 - Balloon services
 - Does not include Shuttle launch services



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights : Management

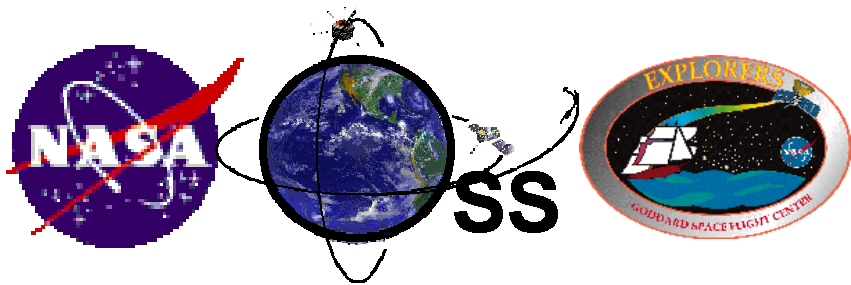
- Restrictions for NASA center project management
 - Only applies if project management/ end-to-end systems management performed by a NASA center for a SMEX
 - GSFC or JPL for free flyer
 - GSFC, JPL, or JSC for ISS attached
- Define risk management approach
- Emphasize mission success within cost and schedule
 - Incorporate sufficient margins, reserves, and resiliency
- Minimum mission must be defined (SMEX only)
 - Consider all possible descope options
- Co-investigator must define role and identify funding
 - Plays necessary role



SMEX 2003 PrePropConf Evaluation and Selection Process

AO Highlights : Foreign Participation

- Foreign participation adds management complexity and risk
 - Includes risk of problems beyond PI's control
 - Cooperative arrangements should offer significant benefits
 - No-exchange-of-funds basis
- Letters of endorsement are required
 - Funding agency endorsement required if applicable
- Must describe how export laws will be complied with
 - During Phase A and Phases B/C/D/E
 - See separate export control presentation
- If LOA is anticipated, letter of endorsement must contain either (1) statement that sponsoring entity can bind government or (2) advance agreement that LOA's will be governed by U.S. law

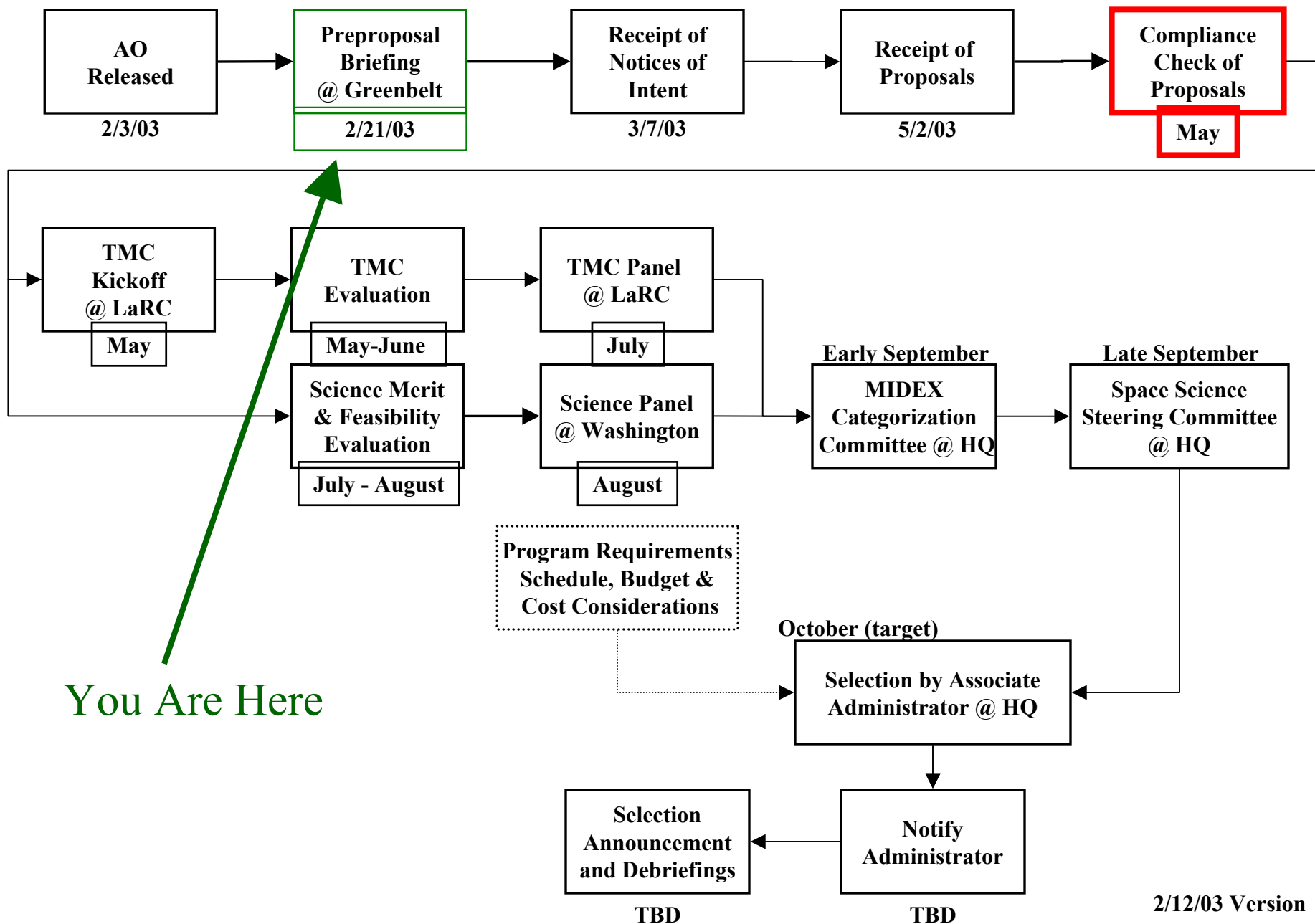


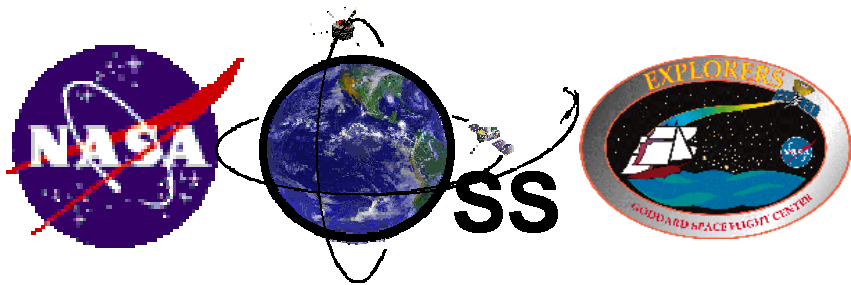
SMEX 2003 PrePropConf Evaluation and Selection Process

What's “New” in this AO?

- Full TMC evaluation
- Cost caps (\$120M SMEX and \$35M MO)
- Launch dates (NLT August 2008 SMEX)
- No Shuttle launched free flyers
- Shuttle launch costs must be included within cost cap
- LDB, ISS, New science mission extension opportunity as MO
- Phase F opportunities; proprietary data opportunity
- Requirements flowdown required
- Restriction on NASA center project management
- Additional emphasis on cost risk; minimum cost reserves
- Additional risk management requirements
- Additional foreign letter requirement
- Additional attention and requirements for foreign participation

SMEX 2003 AO Evaluation Flow



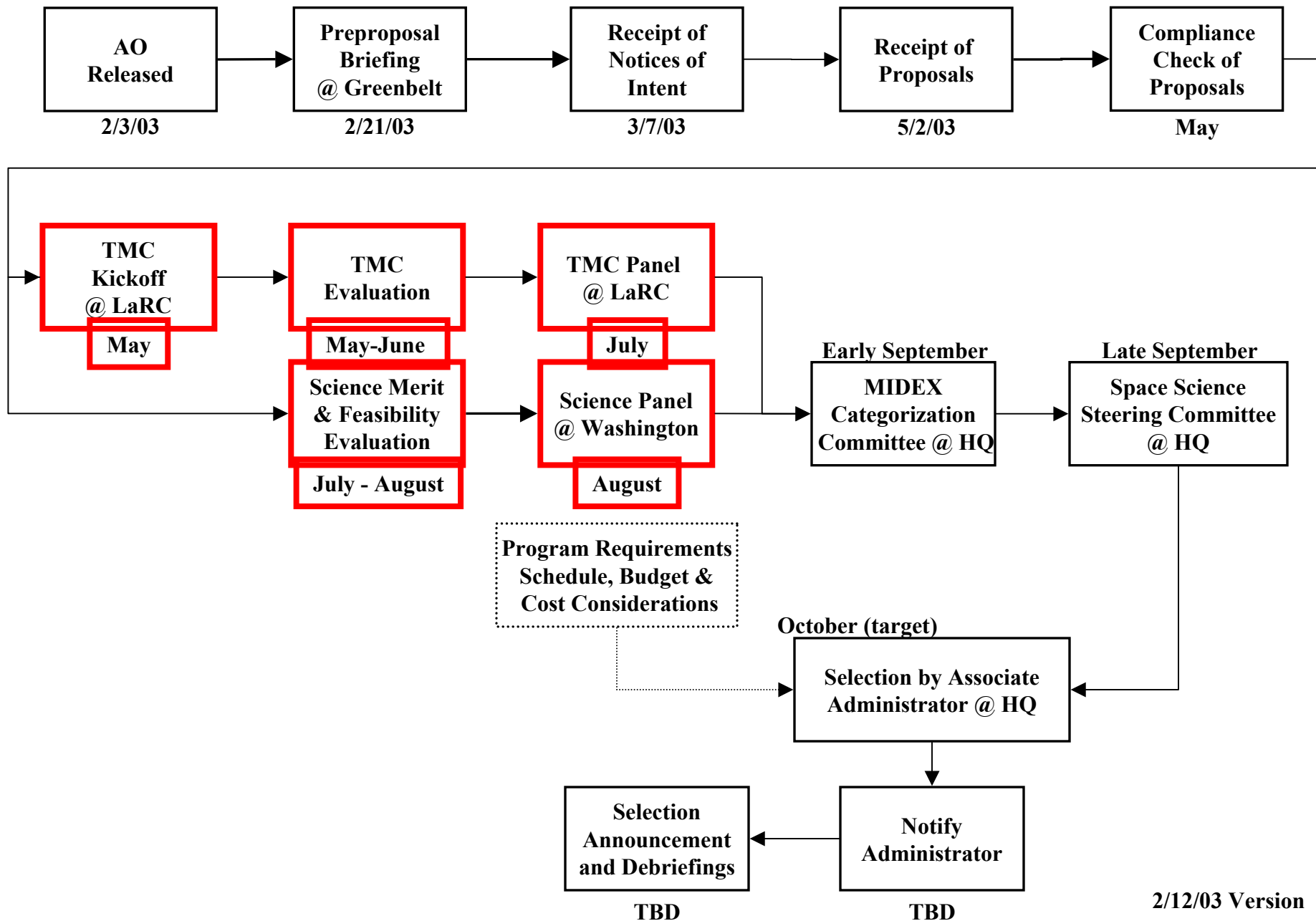


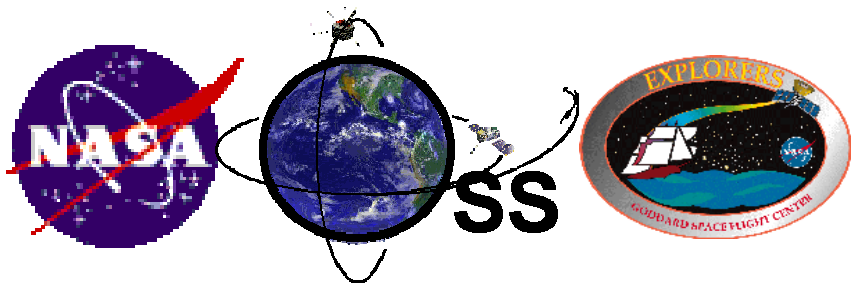
SMEX 2003 PrePropConf Evaluation and Selection Process

Compliance Check

- Proposals received and screened for compliance with AO
 - Proposal received on time (signed original, 55 copies, CD)
 - Complete and within page limit (one volume containing investigation summary, cover page, fact sheet, satisfies Appendix B, required appendices, budget files)
 - Science goals and objectives within solicited themes
 - Includes flowdown, archiving, minimum mission
 - Cost within cap (cost to NASA, total mission cost)
 - Launch/commitment date
 - E/PO etc. commitment
 - Letters of Endorsement (organizations offering goods/services, major participants, launch service provider if not NASA, non-NASA funding agencies).

SMEX 2003 AO Evaluation Flow

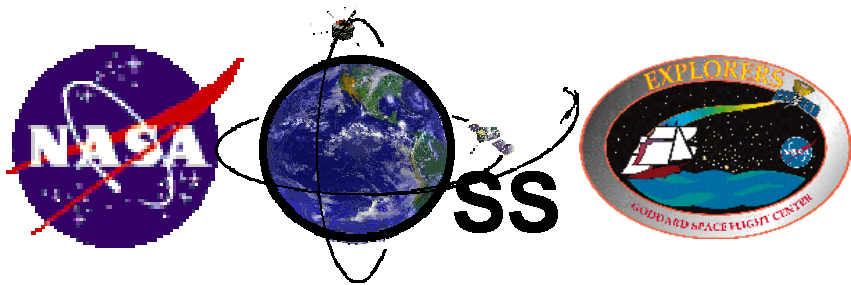




SMEX 2003 PrePropConf Evaluation and Selection Process

Evaluation Process

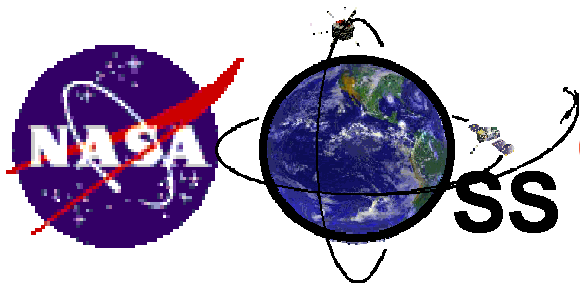
- Scientific/Technical Peer Panels
 - Assigned to science panel based upon science theme designation, primary science proposed, primary science instrumentation and technology proposed
 - Panels formed with expertise in scientific topic areas and science instrumentation
 - Conflict of interest avoided
- Proposals reviewed in depth for scientific merit and technical merit/feasibility
 - Major/minor strengths and weaknesses identified and recorded
 - Evaluation criteria assigned an adjectival rating (Excellent, Very Good, Good, Fair, Poor) based on findings



SMEX 2003 PrePropConf Evaluation and Selection Process

Evaluation Process (continued)

- Technical, Management, Cost Panels
 - Managed by Earth and Space Science Support Office at Langley Research Center
 - See next presentation

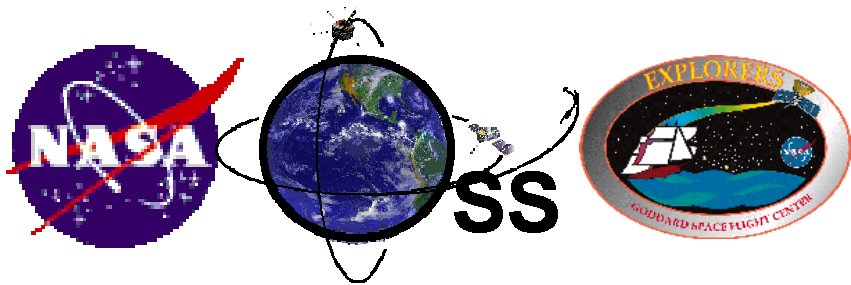


SMEX 2003 PrePropConf Evaluation and Selection Process

Evaluation Criteria: Scientific Merit

- To evaluate the Scientific Merit of the proposed investigation**, the following factors will be considered:
 - Impact of the investigation on NASA space science themes and on the U.S. space science program
 - How well the investigation
 - fills gaps in the understanding of space science
 - provides progress in a NASA space science theme
 - synergistically supports ongoing space science missions
 - provides ancillary benefits to U.S. space science program
 - Sufficiency of data to complete the proposed investigation
 - (SMEX only) Scientific value of Minimum Mission

** For a Mission of Opportunity, the proposed investigation encompasses only the contribution to the mission, not the entire mission.

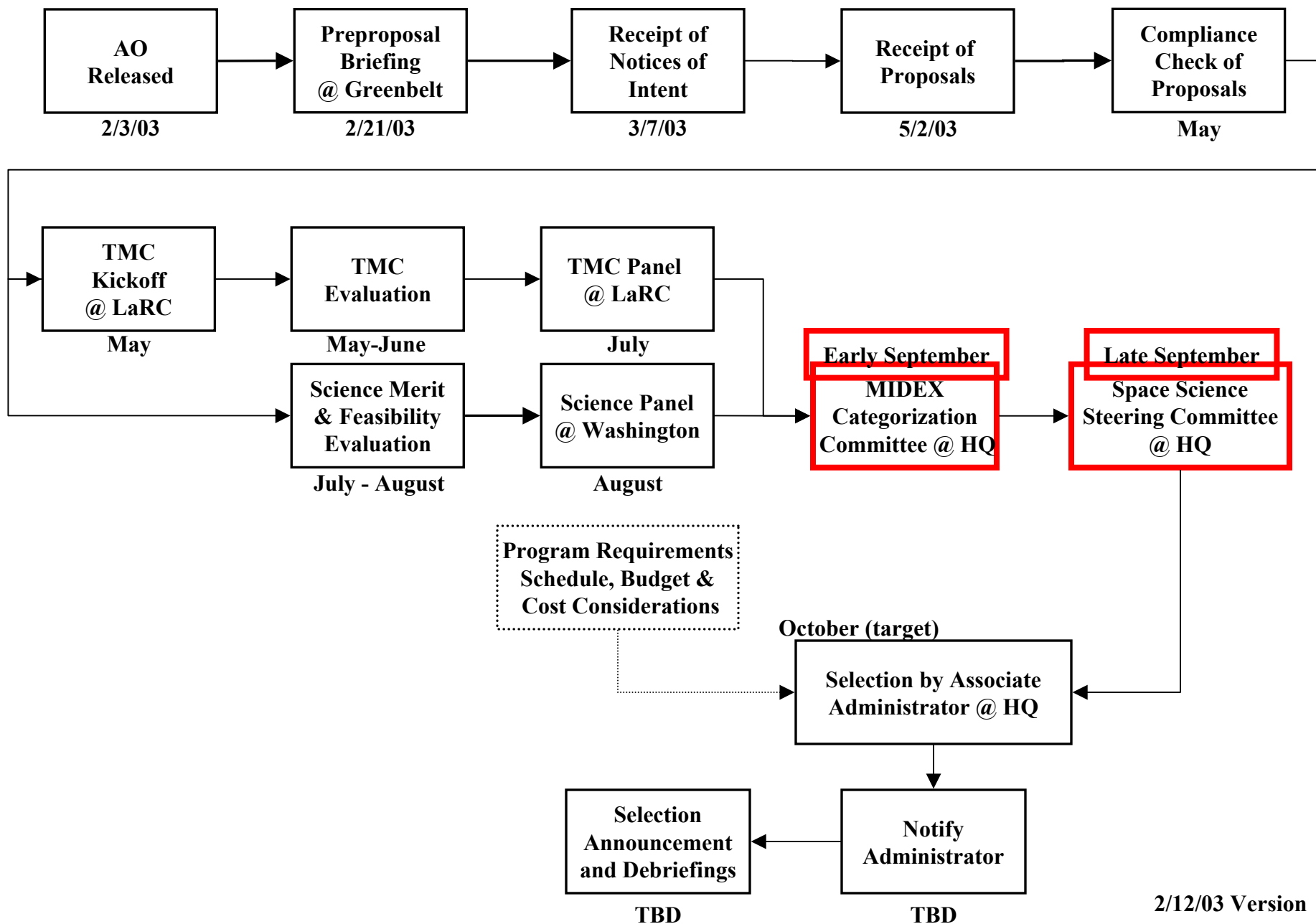


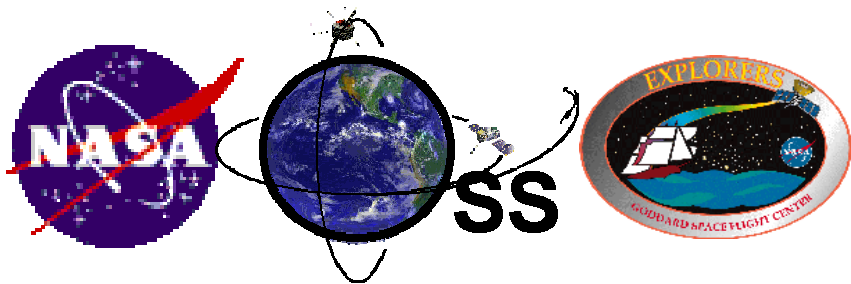
SMEX 2003 PrePropConf Evaluation and Selection Process

Evaluation Criteria: Scientific Implementation Merit

- To evaluate the Scientific Implementation Merit of the investigation, the following factors will be considered:
 - Relationship between the proposed scientific objectives, the data to be returned, and scientific implementation to be used in carrying out the investigation.
 - Degree to which the proposed instrument(s) can be built using the proposed technologies.
 - Degree to which the proposed instrument and mission can provide the necessary data.
 - Merit of the proposed data analysis and archiving plan; merit of the proposed plan for timely release of data to the public domain.
 - Selection of appropriate science enhancement options.
 - Likelihood of success of any proposed new technology or untested advance in the state of the art.
 - Probability of success based on (i) experience, expertise, and organization of science team and on (ii) technical risk associated with mission design and instrument set.
 - Necessary contribution of each co-investigator.

SMEX 2003 AO Evaluation Flow



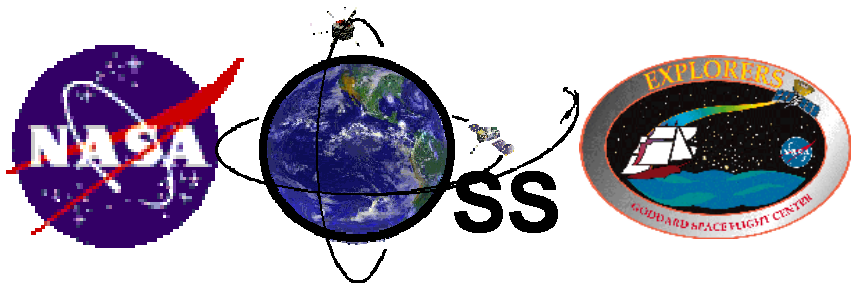


SMEX 2003 PrePropConf Evaluation and Selection Process

Categorization (§7.1)

- Category I. Well conceived and scientifically and technically sound investigation pertinent to the goals of the program and the AO's objectives and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that any essential flight hardware or other support can be delivered on time and that data can be properly reduced, analyzed, interpreted, and published in a reasonable time. Investigations in Category I are recommended for acceptance and normally will be displaced only by other Category I investigations.
- Category II. Well conceived and scientifically or technically sound investigations which are recommended for acceptance, but at a lower priority than Category I.
- Category III. Scientifically or technically sound investigations which require further development. Category III investigations may be funded for development and may be reconsidered at a later time for the same or other opportunities.
- Category IV. Proposed investigations which are recommended for rejection for the particular opportunity under consideration, whatever the reason.

In response to this AO, NASA intends to select and fund only Category I investigations for flight.

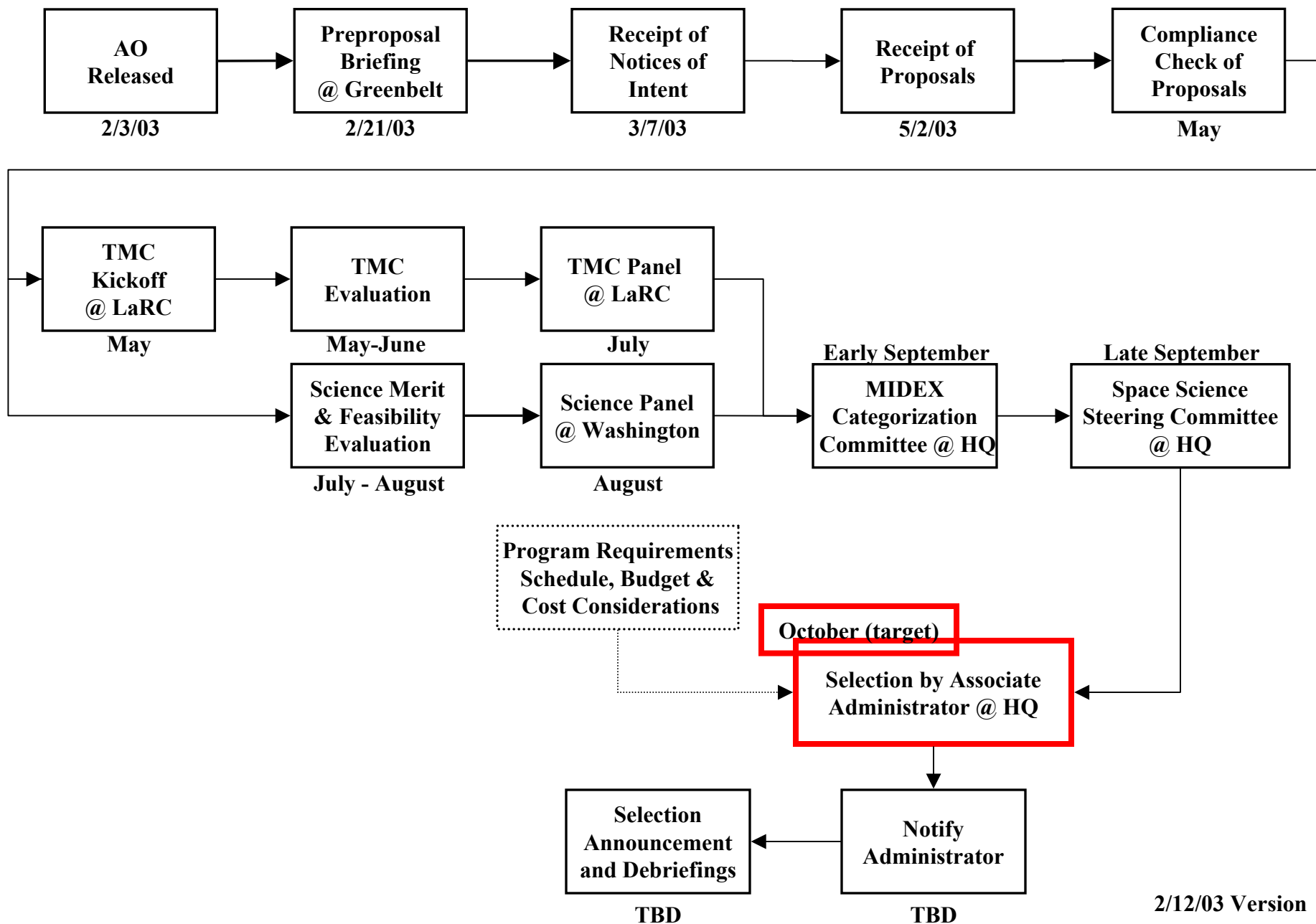


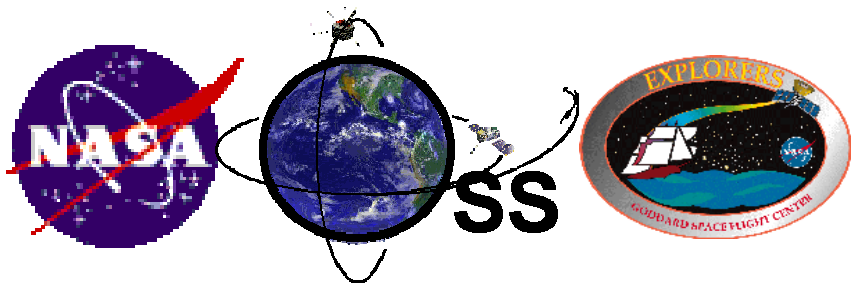
SMEX 2003 PrePropConf Evaluation and Selection Process

Evaluation Criteria

- Scientific merit of the proposed investigation [40%]
- Scientific implementation merit of the proposed investigation [40%]
- Technical, management, and cost (TMC) feasibility, including cost risk, of the proposed investigation [20%]
 - Weights are for categorization only, not selection

SMEX 2003 AO Evaluation Flow

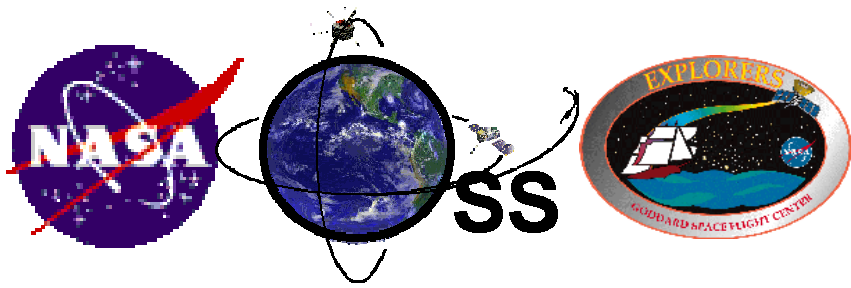




SMEX 2003 PrePropConf Evaluation and Selection Process

Selection (§7.3)

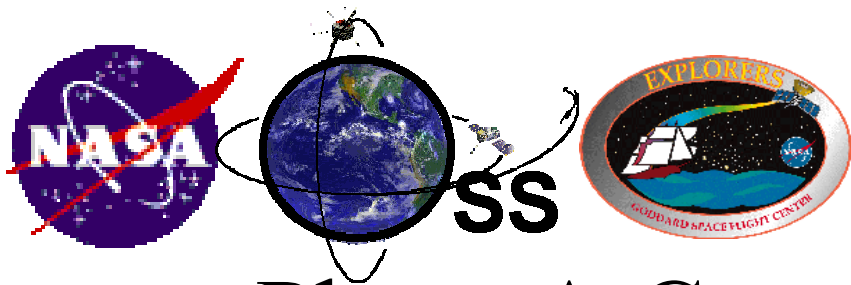
- Selection Factors
 - Proposal evaluations based on published criteria
 - Categorization
 - Cost to NASA OSS
- Overriding consideration: Maximize scientific return within the available budget
 - Space Science program is an evolving activity; selecting official will use all available science planning, policy, and cost considerations
 - Objective (not requirement) to balance among scientific themes
- Select up to four SMEX investigations for Phase A concept studies



SMEX 2003 PrePropConf Evaluation and Selection Process

Selection Criteria

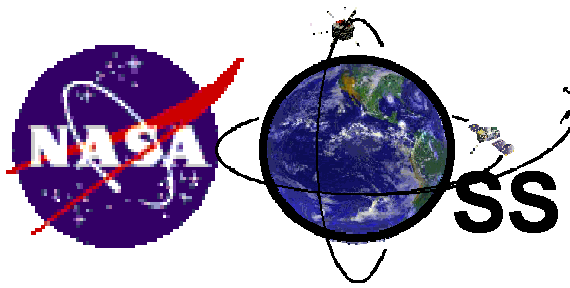
- Scientific merit of the proposed investigation [33%]
- Scientific implementation merit of the proposed investigation [33%]
- Technical, management, and cost (TMC) feasibility, including cost risk, of the proposed investigation [17%]
- Proposed cost to NASA OSS [17%]



SMEX 2003 PrePropConf Evaluation and Selection Process

Phase A Concept Study and Downselection (§7.4)

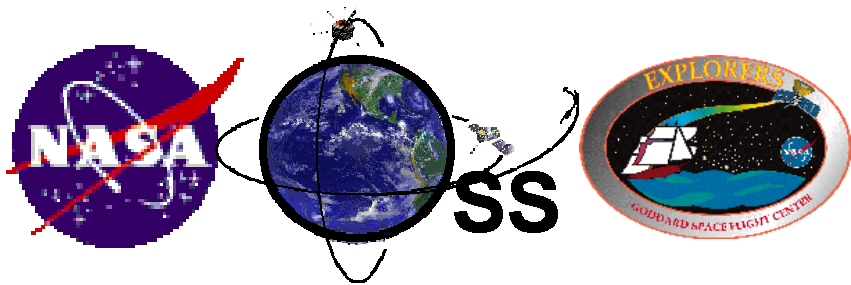
- Up to 4 SMEX investigations selected
 - Selection by AA and SSB in October 2003
 - Phase A contract with option for 2 month bridge phase
 - Concept study cost up to \$500K (RYS)
 - Product of concept study is report to NASA and commitment by PI for cost, schedule, and scientific performance of investigation
 - See “Guidelines for Concept Study Report Preparation”
- Expect to downselect to two SMEX investigations
 - NASA may request presentations and/or site visits
 - Downselection by AA and SSB in August 2004



SMEX 2003 PrePropConf Evaluation and Selection Process

Helpful Hints

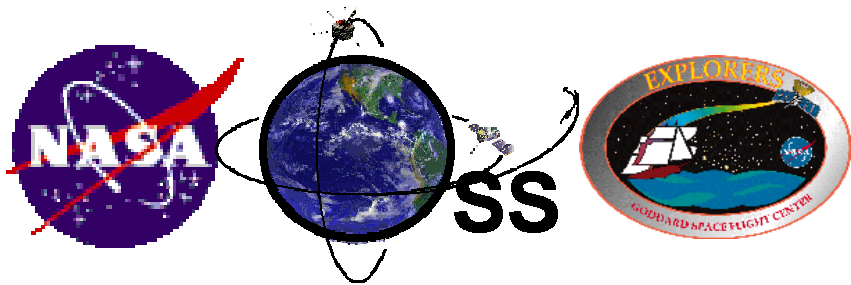
- Read the AO carefully and follow all instructions
- Your primary audience is the science peer review
 - Out of all the excellent science investigations that are proposed, why is yours the one that should be selected? Why is your investigation the best way to achieve your science objectives?
- Your secondary audience is the TMC peer review
 - How will you accomplish your science objectives within the proposed resources? Why do you believe that you can accomplish your science objectives within the proposed resources?



SMEX 2003 PrePropConf Evaluation and Selection Process

Guidelines for Science Section

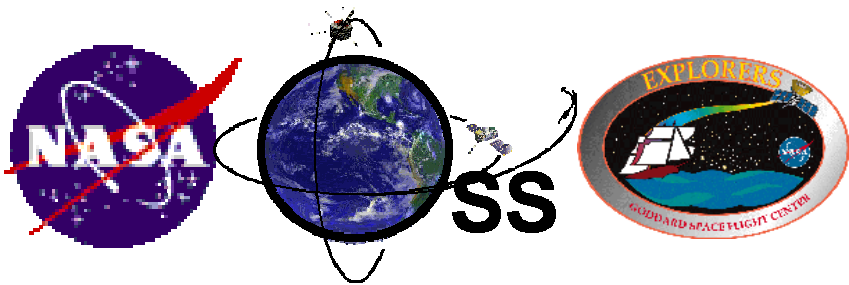
- Describe scientific objectives, identify primary science theme, describe value of investigation to theme.
- Discuss scientific products, discuss how products and data will fulfill scientific objectives.
- Discuss science implementation, discuss how instruments and mission will deliver the required data.
- Discuss how data will be obtained, discuss plan for delivery of data products, identify individuals responsible.
- Describe history and basis for proposal, note relationships to other missions, provide overview of mission.



SMEX 2003 PrePropConf Evaluation and Selection Process

Guidelines for Science Section

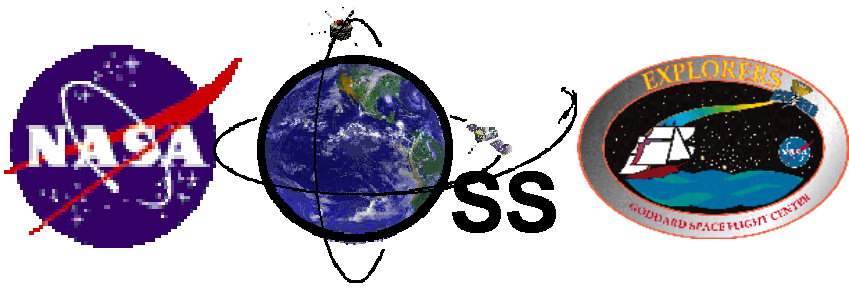
- Define Baseline Mission: discuss measurements to be taken and data to be returned, identify approach leading from data to science objectives, identify quality and quantity of data returned, explicitly describe relationship between data products and scientific objectives.
- Define Minimum Science Mission: identify minimum acceptable data and scientific return below which mission would not be worth pursuing, discuss value of Minimum Science Mission, describe descope options available (not just instruments or mission life time) and their effect on meeting science objectives.
- Identify only one Baseline and one Minimum Science Mission.



SMEX 2003 PrePropConf Evaluation and Selection Process

Guidelines for Science Section

- Describe science implementation, including
 - Instrumentation: describe instrumentation, criteria for selection, individual instruments and heritage, characteristics and performance, block diagrams, interfaces, etc.
 - Mission: observing strategy, spacecraft performance, mission concept, etc.
 - Data Analysis and Archiving: data reduction and analysis plan, method and format, data products, schedule to NASA archive.
 - Science Team: members, roles, responsibilities.
- Science requirements should flow down to everything else.

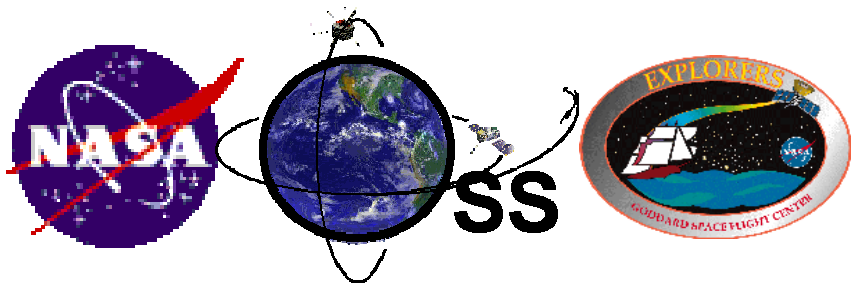


SMEX 2003 PrePropConf Evaluation and Selection Process

Proposal Science Requirements

- Proposal must contain
 - Clearly stated relationship between the proposed scientific objectives, the anticipated data, and the instrument payload.
 - All technical aspects of the investigation from initial studies through delivery of data and scientific analysis.
 - Data plan** including appropriate period for science analysis (independent of archiving) and specification of time required for archiving appropriate data for the scientific community and the general public (justify minimum time necessary and any proprietary period).

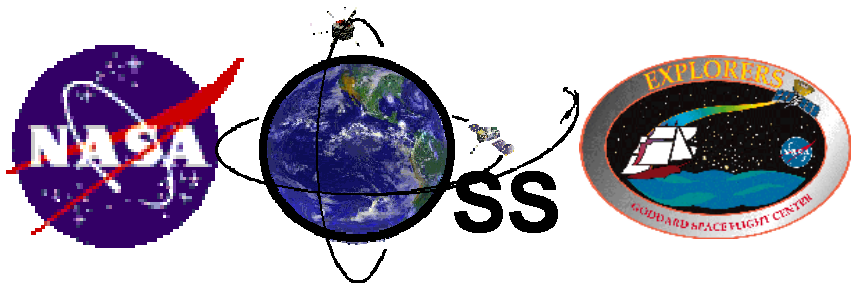
** Mission of Opportunity investigation team's data analysis responsibilities defined by mission sponsor.



SMEX 2003 PrePropConf Evaluation and Selection Process

Proposal Science Requirements

- Science Team Responsibilities
 - Initial analysis of data, delivery to an appropriate data repository, publication of scientific findings, and communication of results to the public.
 - Release data as soon as possible (after appropriate brief validation period).
 - Collect scientific, engineering, and ancillary information necessary to validate and calibrate scientific data.
 - Implement E/PO program.



SMEX 2003 PrePropConf Evaluation and Selection Process

Primary Resources

- The SMEX AO 03-OSS-02
 - <http://spacescience.nasa.gov/>, select “Research Opportunities”
 - http://research.hq.nasa.gov/code_s/nra/current/AO-03-OSS-02/
- The SMEX Explorer Program Library
 - <http://explorer.larc.nasa.gov/explorer/sel.html>
- The SMEX Acquisition Additional Information Home Page
 - <http://explorer.larc.nasa.gov/explorer/smexacq.html>
- Technical Points-of-Contact
 - Points of Contact (see Library documents)
- The Explorer Program Scientist
 - paul.hertz@hq.nasa.gov